

The amazing amph

The air is filled with many sounds of life! Sure signs of spring are the choruses of croaks, chirps, squeaks and peeps that can be heard at dawn or dusk. Frogs and their relatives, toads, salamanders and newts, gather by ponds

By Bobbie Winn

everywhere to breed. These animals form the class of animals called amphibians. The name amphibian comes from a Latin word, *amphibious*, which means "living in two ways." Most amphibians start their life in water and mature on land. This process is called metamorphosis. Amphibians are the only vertebrates (animals with back bones) that undergo metamorphosis.

Metamorphosis is a big word that means *change*. For example, tadpoles and pollywogs are the larval stage of the best known amphibians, frogs and toads. Most frogs and toads lay eggs in watery places like ponds, marshes, swamps, ditches or even in tiny puddles. They lay a large quantity of eggs at one time that form either a grape-like cluster or long tangled strands, and they are often attached to aquatic plants. The eggs have a clear, jelly-like coating that helps protect the developing embryo. When the eggs hatch into tadpoles, they are like little fish with tails and gills for breathing. Tadpoles feed on algae as they slowly transform into adults (the length of time depends upon the species and water temperature). During metamorphosis, amphibians undergo major changes, both inside and outside. Back legs and front legs grow, tails shrink and finally disappear, gills are replaced by air breathing lungs, and mouths

expand to gaping jaws with sticky tongues, capable of swallowing large insect.

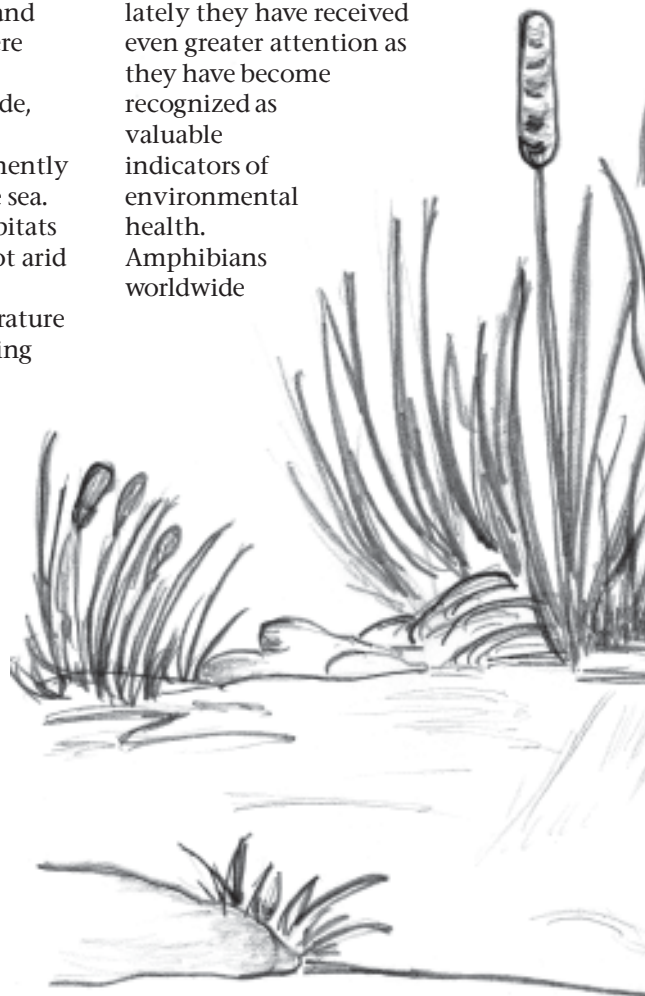
Frogs and toads are members of the oldest terrestrial vertebrate group on earth. Some of the earliest fossils date amphibians from about 360 million years ago. Early amphibians were much larger than those of today (up to 12 feet long) and were covered in bony plates for protection. In the late Jurassic period (about 190 million years ago), "modern" amphibians with skeleton shapes and bodies similar to those of today were dominant.

Amphibians are found worldwide, except in Polar Regions or at high altitudes where the land is permanently covered with snow, and within the sea. They inhabit a great variety of habitats from wet, tropical rainforests to hot arid deserts. They are cold-blooded, or exothermic, relying on the temperature of the air, water and soil surrounding them to regulate their body temperature. In colder regions, some amphibians will burrow underground and hibernate to keep from freezing during the winter.

Amphibians have a moist, glandular skin through which water and oxygen can be absorbed. They have two main types of glands: mucous glands to keep their bodies moist, and poison glands which secrete a milky, sticky substance that is distasteful to predators. Some secretions are not only distasteful but deadly; various native cultures of Central and South America used poison frog secretions to coat the tips

of their blowgun darts. Recently, scientists have isolated substances from frog poison glands to create a new painkiller stronger than morphine, but without morphine's side effects.

For centuries, frogs have been treated with a mixture of curiosity, superstition and fear. The genre of fairytales, where the frog miraculously turns into a prince, hallmarks the fascination with tadpoles. Although historically celebrated in legend and lore, lately they have received even greater attention as they have become recognized as valuable indicators of environmental health. Amphibians worldwide



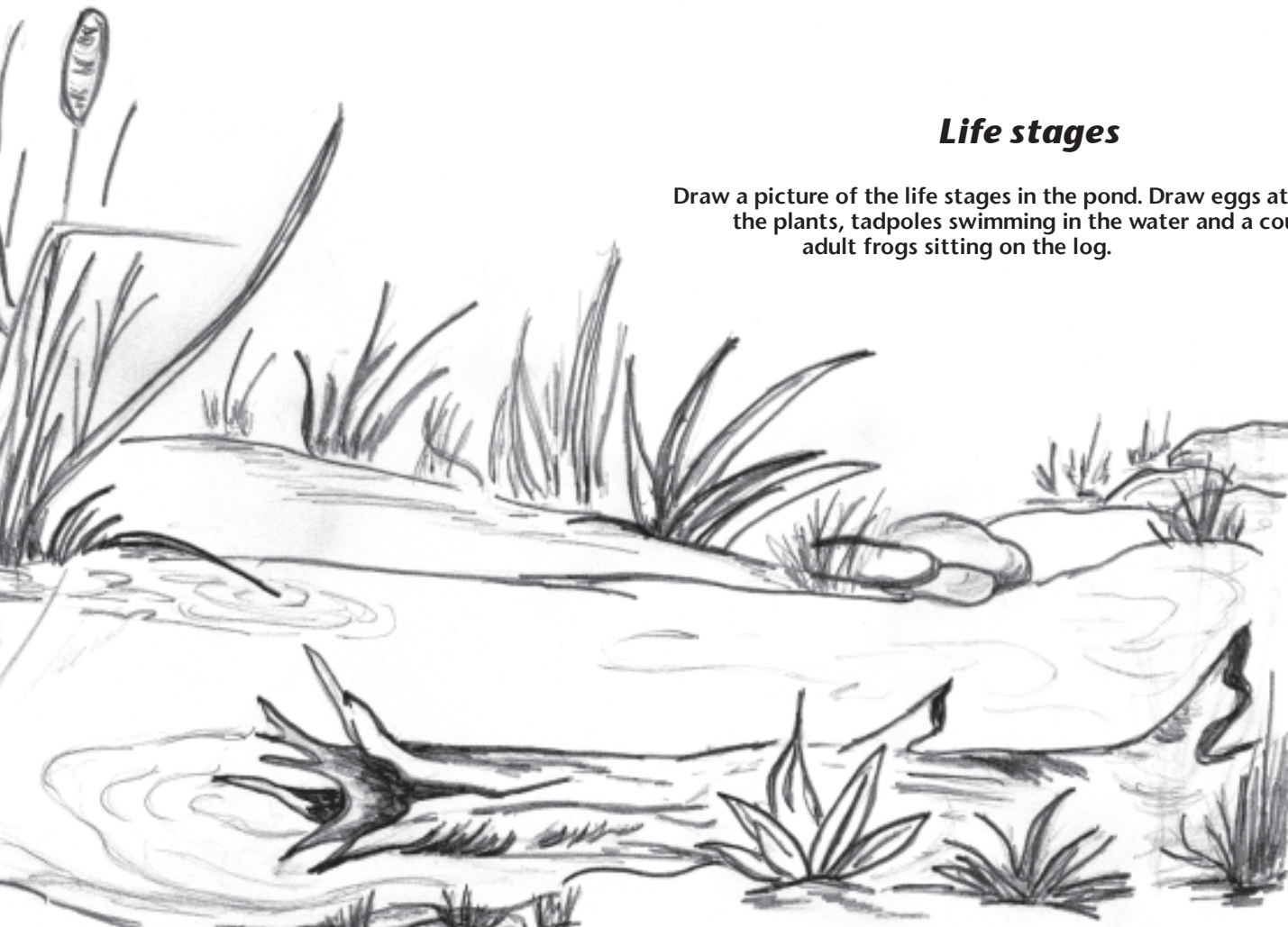
Amphibian

have been disappearing at an alarming rate. Why should we be concerned about amphibian decline? Their permeable skins, eggs lacking protective shells, and complex life cycles within both aquatic and terrestrial realms make them especially susceptible to environmental stressors. They are like the “canary in the coal mine,” sending us a warning as they die off.

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Life stages

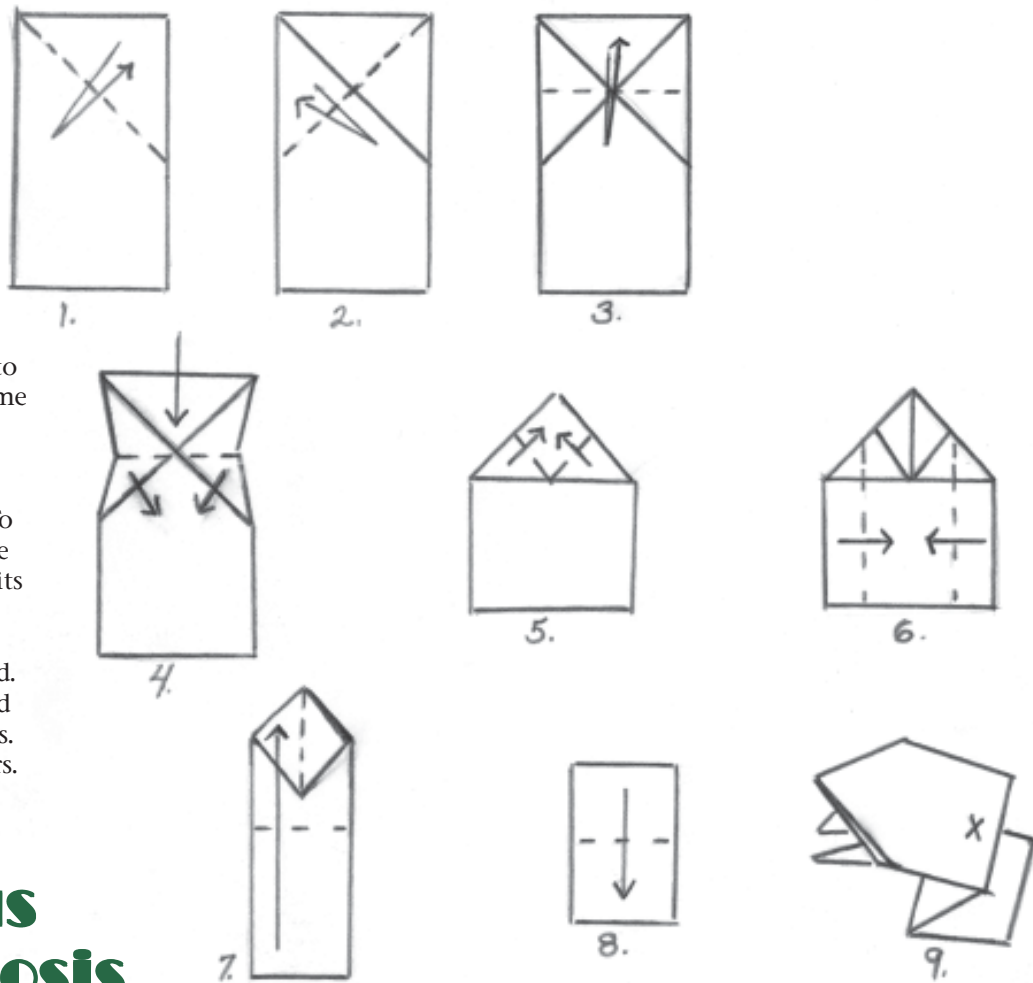
Draw a picture of the life stages in the pond. Draw eggs attached to the plants, tadpoles swimming in the water and a couple of adult frogs sitting on the log.



Fold a frog

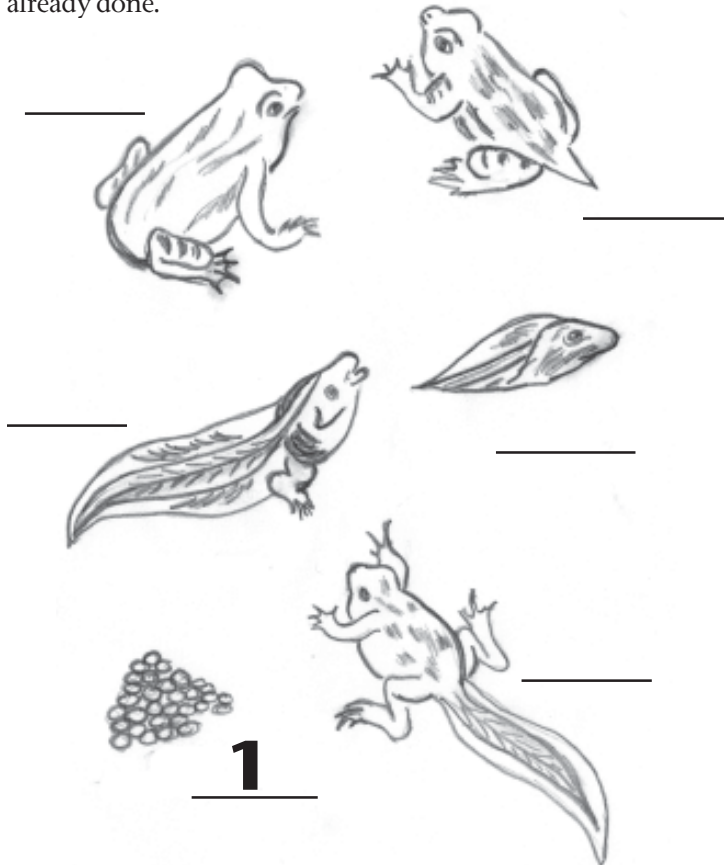
Origami, the Japanese art of folding paper into three-dimensional figures, is an ancient craft. In the 16th century A.D. Buddhist monks traveling from China brought thin flat sheets of plant fiber to Japan. The Japanese called these thin sheets of plant fiber, *kami*, which means paper. Soon the art of folding (*ori*, in Japanese) squares of paper into representations of animals and people became a national tradition. Origami figures were crafted for ceremonies, decorations and as toys. Create an origami frog that will jump. Decorate your frog with markers or paint. To make the frog jump, place it on a flat surface and gently tap on the spot with the "X" on its back in the instructions (#9).

Directions: Use a 3 by 5 inch index card. Make folds along the dotted lines shown and fold in the direction indicated by the arrows. Make the creases carefully, matching corners. * For steps 1-3, turn over the card and repeat each fold to make a better crease.



Miraculous metamorphosis

Here are drawings of different stages a frog would go through as it changes from an egg to an adult. Can you put them in the proper order? Place numbers next to each stage to show the order in which they belong. The first stage, the egg, is already done.



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